

23 July 2013

Dear SDT,

At our 2<sup>nd</sup> meeting in Fairbanks, we developed a set of “second-tier” science questions (Box 1) that integrated across the five working groups (Box 2) formed at the meeting. The work strategy now, as agreed upon at the meeting, is to organize each WG to develop the discussion around (explanation and justification), research strategy for, and objectives of each science question for which your WG has been assigned. The material that the WGs put together for these “top-level” aspects of each science question will form the basis for Chapter 3 of the Concise Experiment Plan (Box 3). Further, the WGs are tasked with assembling more detail on the research requirements to meet the stated objectives for each question.

### *1. Chapter 3 Writing*

Feel free also to adjust the wording of your question(s) as needed. The description and rationale for each question should be carefully thought out and worded so as to capture the thorough and unambiguous explanation of the question in a concise 2 to 4 paragraphs. The research questions developed by the SDT for the most part fall within the major research categories contained within the ABoVE Scoping Study Report (see attached Word Version of this report). The WGs should feel free to use/modify text from this report where appropriate. In addition to the explanation and rationale for each question, Chapter 3 should contain only (briefly) the top-level research approach needed to address each question. This text should broadly consider the types of “indicators” / key variables necessary to observe / measure / scale / model in order to address each question. Again, this will need to be informative but succinctly worded in 2 to 4 paragraphs. Overall, the text associated with each question should be less than two pages.

### *2. Study Objectives*

There was a discussion at the meeting that suggested each question could / should lead to specific study objective(s) for the research funded through ABoVE. As noted during the 2<sup>nd</sup> SDT meeting, the questions that have been developed (Box 1) are very broad in nature, and developing specific objectives may be needed to identify the specific types of research that will be carried out during ABoVE. WGs should consider developing a “strawman” objective or two that attempts to capture what ABoVE expects to achieve to improve our understanding about, advance the science of, and/or reduce the uncertainty related to each science question. This can be considered a statement of our overall goal in asking each question.

### *3. Research requirements*

Finally, following the development of the material for Chapter 3, each WG is expected to identify specific research, model development, and data sets needed to address each question (and their associated objectives). This more detailed analysis will provide the basis for developing the integrated research strategy presented in Chapter 4 of the CEP. The details of the specific activities involved in the

research approach for each science question (and associated objectives) will not necessarily appear in Chapter 3, but rather be included as text, tables or other visuals in appendix material. In developing this additional material, each WG should consider: (a) what improvements to models are needed to address the questions/objectives (e.g., what improvement in models will take place as the result of ABoVE)? (b) What research is needed for these model improvements? And (c) what data sets are needed to carry out this research?

In addressing questions (b) and (c), each working group should then (1) identify ongoing and planned research in the ABoVE study region that is carrying out research/collecting data to address question (b)? (2) What datasets are available or will become available over the next 5 to 7 years (including remotely-sensed data) that can be used during ABoVE? and (3) what types of research and data set development (including RS data) specifically will be carried out during ABoVE?

### *Workflow*

The WGs are tasked with developing this material over the next several weeks between now and the next (3<sup>rd</sup>) SDT meeting (15 – 17 October, 2013), with updates from each WG and input / discussion from the full SDT during the telecons regularly scheduled for the interim (Box 4). For *Chapter 3 Writing*, the approximately two pages of text associated with each question should be ready in final draft form by the end of August. The *study objectives* associated with each question should be developed by early September. The *research requirements* for each objective should be developed by the end of September. Prior to the 3<sup>rd</sup> SDT meeting, we will discuss an *integrated research strategy* that incorporates the more detailed *study objectives* and *research requirements* into a cross-cutting set of objectives (i.e. what ABoVE will be all about) and a top-level description of how ABoVE campaign will address them. We plan for the development of this *integrated research strategy* to be the focus of the 3<sup>rd</sup> SDT meeting.

Feel free to contact members of other WGs if you feel they may be able to contribute to the research questions your WG is responsible for.

If you need to arrange for a teleconference for your WG, please contact Peter Griffith. Also, Peter and Liz can provide support in using the databases they are developing to support the SDT.

Thanks all for the good discussion and solid work put in on this so far; we look forward to working on this with the group. As always, don't hesitate to be in contact if you have any questions / comments / concerns.

Thanks,

- Eric & Dan

**BOX 1: Second-tier science questions for ABoVE.**

	Question	Working Group
1	How are environmental changes affecting subsistence & cultural resources, human health, and infrastructure – and their interactions – in the ABR and how are human societies responding?	1
2	How are environmental changes in the ABR affecting natural & cultural resources and climate regulation and how are human societies within and beyond the region responding?	1
3	What are the changes in the distribution and properties of permafrost in the ABR and what is controlling those changes?	2
4	How are disturbance regimes in ABR changing and what processes are controlling those changes?	3
5	How are ABR flora and fauna responding to changes in biological, chemical and physical processes and what are the impacts on ecosystem structure and function?	3
6	What are the changes in the magnitude and fate of soil organic carbon pools in the ABR and what processes are controlling the rate of those changes?	4
7	What are the changes in the spatial distribution of water, and the amount and timing of water discharge in the ABR and what is controlling those changes?	5
8	How do changes in hydrologic flow paths and residence time affect ecosystem structure and function and materials export in the ABR?	5
9	How do complex interactions affect the trajectory of ecosystem structure and function in the ABR and what will be the consequences for human societies within and beyond the region?	6

**BOX 2: Chapter 3 Working Groups.**

<b>Working Group</b>	<b>Name</b>	<b>Working Group</b>	<b>Name</b>
<b>1. Societal</b>	Steve Colt	<b>4. Soil Carbon</b>	Sharon Billings
	Jeremy Karchut		Josh Fisher
	Libby Larson		Forrest Hall
<b>2. Permafrost</b>	Scott Goetz	<b>5. Hydrology</b>	Bob Harriss
	Guido Grosse		Ruth Varner?
	Dan Hayes		Peter Griffith
	Chip Miller		Mike Rawlins
<b>3. Flora &amp; Fauna</b>	Natalie Boelman	<b>6. Integration</b>	Rob Striegl
	Eric Kasischke		Matthew Sturm
	Michelle Mack		Ruth Varner?
	Juha Metsaranta		Dave McGuire
			Stan Wullschleger

**BOX 3: Elements of the writing process for Chapters 3 and 4.**

- **Present/describe each science question and explain what is included and how it contributes to the whole of ABoVE**
- **Explain what aspects of the compelling imperative for an Arctic-boreal vulnerability study will be addressed by each question**
- **Briefly describe what types of research activities will be needed to address each question**
- **“Strawman” study objective(s) for each question**
- **Research requirements: specific modeling, research, and dataset development needed to address each study objective**

**BOX 4: Telecon schedule and workflow timeline.**

<b>Date*</b>	<b>Task / Deliverable</b>
<b>Wednesday, August 14, 2013</b>	Progress discussion on Chapter 3 writing
<b>Thursday, August 29, 2013</b>	Final draft of Chapter 3 text
<b>Wednesday, September 11, 2013</b>	Final draft of study objectives
<b>Thursday, September 26, 2013</b>	Progress discussion on research requirements
<b>Wednesday, October 09, 2013</b>	Discussion on integrated research strategy
<b>October 15, 16, 17, 2013</b>	3 <sup>rd</sup> SDT Meeting

\* note all telecons scheduled for 1:30 to 3:30pm Eastern.